

## Vegetation of the Eastern Communal Conservancies in Namibia: III. Annotated Checklist

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### Abstract

*A reconnaissance survey of the vegetation of the communal conservancies Otjituuo, Okamatapati, Ozonahi, African Wild Dog, Otjinene, Epukiro, Otjombinde, Omuramba Ua Mbinda, Eiseb and Ondjou, as well as the farming areas of Otjinene and Epukiro, was conducted in 2004. These data were used to compile a species checklist which was later expanded according to herbarium records. The total of 442 listed species is considerably higher than the previously estimated 150 to 300 species for the area. Yet, the species list is considered as incomplete, as the area is generally under sampled both in terms of herbarium specimens and vegetation relevés. At least 680 species are estimated to occur in the area. In addition to the listing of species, information is provided on the status, growth forms, plant functional attributes, distribution and abundance of the plants.*

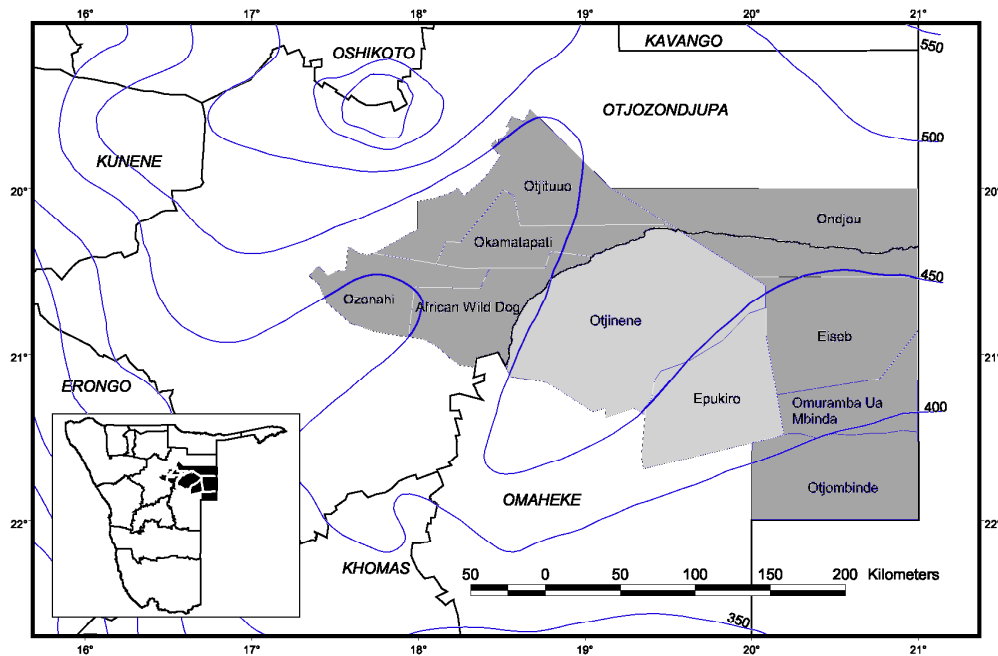
**Keywords:** Namibia; Kalahari; plant functional attributes; Raunkiaer life form; species diversity

### Introduction

Since Namibia's independence, several conservancies have been established in communal areas to assist communities in managing their natural resources sustainably, with great success (Weaver & Skyer, 2005; Weaver & Petersen, 2008). The Desert Margins Programme in Namibia aimed at supporting the emerging conservancies in the eastern communal areas (the Otjituuo, Okamatapati, Ozonahi, African Wild Dog, Otjinene, Epukiro, Otjombinde, Omuramba Ua Mbinda, Eiseb and Ondjou communal conservancies – Figure 1) in developing management plans. Within this context, a vegetation survey was undertaken in the area (Strohbach *et al.* 2004), also covering the farming areas of Epukiro and Otjinene.

The vegetation falls largely within the Tree Savannah and Woodland (Northern Kalahari) (Giess 1998), but especially the southern part is strongly ecotonal towards the Camelthorn Savannah (Central Kalahari), whilst the western part fringes on the Thornbush Savannah. This results in rather homogenous landscapes in the central parts with very gradual changes in composition towards the far south-east, and more distinct changes towards the west and south-west, as the vegetation changes into Thornbush savannah. In the far north, near Otjituuo, the study area falls within the southern extent of the Karstveld. The vegetation of the eastern communal conservancies has been fully described (Strohbach, submitted), and the environmental drivers of this vegetation were described in a second paper (Strohbach & Kutuahuripa, submitted). In this third paper of the series, an annotated species list of these conservancies and farming areas is presented.

The plant diversity of the study area is estimated to be between 150 and 299 species (or “low-medium” diversity), based on incomplete herbarium records due to the general inaccessibility of the area (Craven, 2001; Mendelsohn *et al.* 2002). Based on this assessment, the area is classed as of lesser importance for plant conservation purpose (Hofmeyr, 2004). Yet, management problems, like illegal wood harvesting for fencing posts, exist in these conservancies and farming areas (Hofmann, 2013), and these could lead to severe desertification (Midgley *et al.* 2005; Thomas *et al.* 2005). This study presents a unique opportunity of improving the knowledge of the floristic diversity of the area, which is, in itself, an important management and monitoring tool.



**Figure 1.** Overview map of the communal conservancies within the Omaheke and Otjozondjupa Regions in Namibia. The average annual rainfall is indicated by the isohyets, with their values in mm, on the right. Source data: NARIS, 2001; NACSO, 2011.

## Methods

The survey for this study followed the general method employed for the Vegetation Survey of Namibia project (Strohbach, 2001). During April and May 2004, 422 plots were sampled throughout the study area. The season was regarded as an average to poor season, meaning that the full diversity of species was not observed. This problem was further compounded by the vastness of the area, and the limited access to it, resulting in the survey being done along roads, tracks and cutline's. Often smaller niche and/or azonal habitats were ignored in favour of covering the larger habitats. At each survey plot of 20 x 50 m, a Braun-Blanquet type relevé was prepared; each occurring species was noted down, as was its typical growth form and estimated abundance (crown cover). From this survey data, an initial species list was compiled. The poor season and limited sampling resulted in apparent shortcomings in the list, which was therefore augmented by an extract from the specimen database of the National Herbarium of Namibia (WIND), of species recorded from the relevant quarter-degree squares covering the study area.

Additional species information, as presented in Appendix 1, was compiled as follows:

**Status:** This column reflects the biogeographical as well as the protection status of the various species. Biogeographic information includes endemism and exotic plant status. The various exotic plant categories follow Pyšek *et al.* (2004). The status information on these categories was obtained from Klaassen & Kwembeya (2013).

**Layer:** The layer column indicates the structural layer to which each species normally belongs. The definitions follow Edwards (1983). The following conventions were adhered to:

Tree layer (t): woody plants, single stemmed, >2m, or multi-stemmed, >5m  
 short Tree (t3): (single stemmed), >2m <5m  
 low Tree (t2): >5m <10m  
 high Tree (t1): >10m <20m

Shrub layer (s): woody plant, normally multi-stemmed  
high Shrub (s1): >1m <5m  
low Shrub (s2): <1m

Herb layer (hl): all non-woody species, irrespective whether annual or perennial. The herb layer was further qualified into grasses (species belonging to the family Poaceae, in many parts of the country constituting the main fodder resource for livestock keeping), geophytes (with underground storage organs), hydrophytes (growing in water) and parasites (living off other plants).

The layer information serves to provide additional information on growth forms (especially differentiating between trees and shrubs, which all belong to the life form "phanerophytes" (See the following columns with plant functional attributes).

**Plant Functional Attributes:** For the habitat analysis (Strohbach & Kutuahuripa, submitted), plant functional attributes (PFA's) were used for the species observed during the survey. These include the growth form (Raunkiaer, 1934), leaf size, inclination, chlorotype and morphotype, as well as above-ground root adaptations. These attributes follow the definitions of Gillison & Carpenter (1997) (See also Gillison, 2001). For this purpose a variety of sources were consulted, specifically the "Prodromus" (Merxmüller, 1966), herbarium collections, field identification guides (Van Rooyen, 2001; Curtis & Mannheimer, 2005; Heath & Heath, 2009; Mannheimer & Curtis, 2009), but also internet sources ("JSTOR Plant Science," 2012; "Kyffhäuser," 2012; Conservatoire et Jardin Botaniques & South African National Biodiversity Institute, 2012; Hyde *et al.* 2012; Jürgens *et al.* 2013). The list was completed for all species recorded.

**Abundance:** Using the available classification results (Strohbach, submitted), the list could be subdivided into two mayor habitat types, these being the "Sandveld" and the "Hardeveld", respectively. Species abundance was calculated in two ways:

Overall abundance relates to the number of relevés in which each species occurs, irrespective of its abundance in any specific relevé, per habitat type. The classes are defined as follows:

- Rare: present in <5 % of relevés
- Occasional: present in 5<20 % of relevés
- Common: present in 20<50 % of relevés
- Abundant: present in 50<75 % of relevés
- Widespread: present in >75 % of relevés

Local Abundance refers to the average abundance within the relevés in which the species occur, irrespective of how often it occurs. The classes are defined as follows:

- Rare: 0 < 0.1 % cover
- Occasional: 0.1 < 1 % cover
- Common: 1 < 10 % cover
- Abundant: 10 < 50 % cover
- Dominant: 50 < % cover

Due to the apparent shortcomings of the species list, an estimate of species numbers was made, using the non-parametric first order Jackknife (Heltshe & Forrester, 1983; Palmer, 1990). This method was tested successfully in the Kavango Woodlands (Strohbach & Strohbach, 2004), performing better than the LOGLIN procedure (which is based on a species-area curve (Palmer, 1990).

The first order Jackknife was calculated as follows:

$$SR = SO + r(n-1)/n$$

where: SR is the estimated species richness

SO is the number of observed species

r is the number of species within a particular relevé.

n is the number of relevés

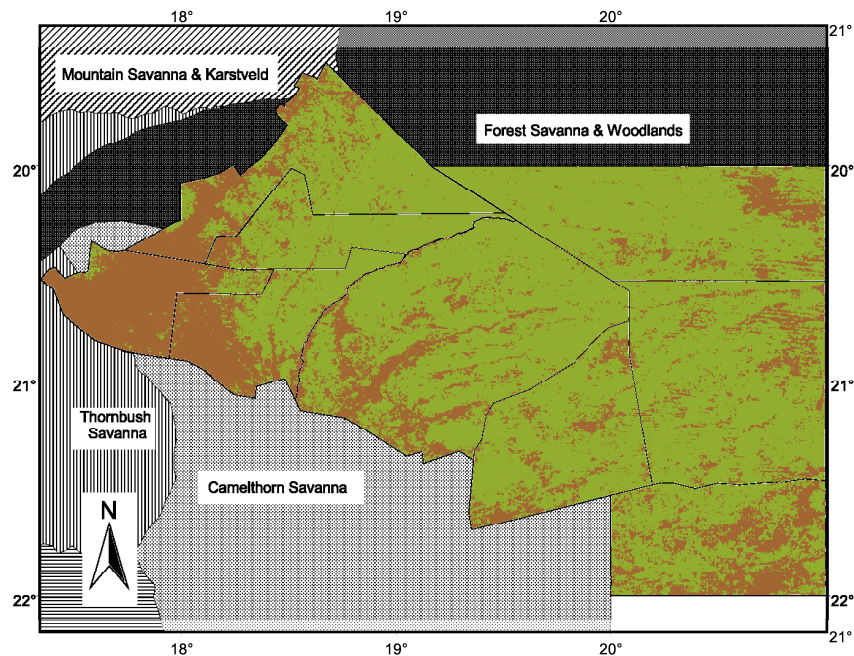
(Heltshé & Forrester, 1983)

Habitat and abundance data are not available for the species listed from the herbarium records, but the Quarter degree squares (QDSs) in which these species were collected, are listed in the final column (See Appendix 1).

## Results & Discussion

The relevé data yielded 442 species. To these were added another 199 species from herbarium records, from 93 QDS's. These 641 species belong to 89 families, of which the three most diverse families are the Poaceae (98 species), Fabaceae (82 species) and Asteraceae (40 species). The full species list of this study area is presented in Appendix 1. Nomenclature and arrangement follows Klaassen & Kwembeya (2013).

The vegetation can be divided into two broad types, these being the “Sandveld”, dominated by *Terminalia sericea* and *Combretum* species, and the “Hardeveld”, comprised of a mixture of savannah dominated by *Acacia* species, Karstveld elements, wetland vegetation, and vegetation on shallow calcareous soils (Strohbach, submitted) (Figure 2). The “Hardeveld” mainly forms a fringe around the sand plains of the Kalahari (the Sandveld), but it also occurs in patches within this sand plateau. Typical “Hardeveld” elements are vleys, calcrete depressions and the *omirimbi* (Strohbach, submitted, 2008).



**Figure 2.** The “Sandveld” vegetation types in green and the “Hardeveld” types in brown, as mapped by Hüttich et al. (2009), in relation to the vegetation types as described by Giess (1998).

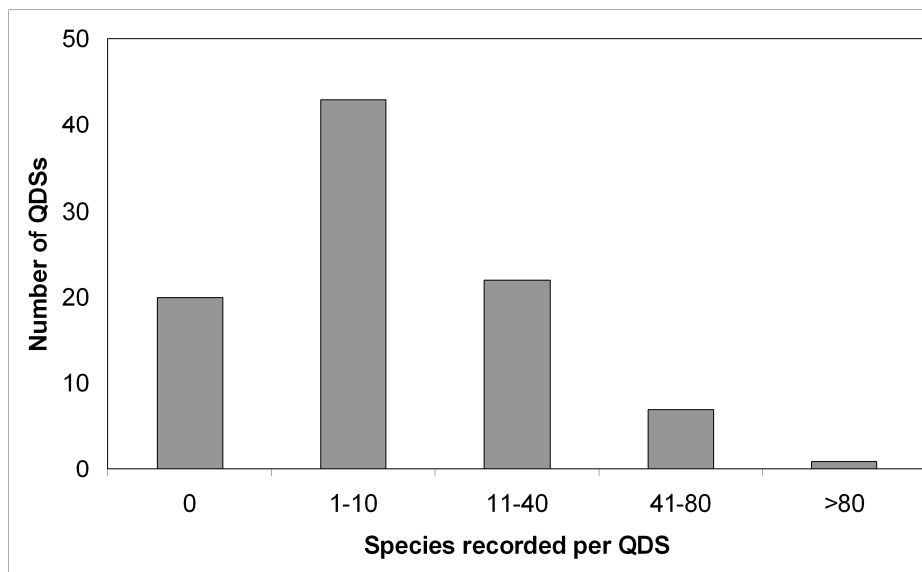
For the “Sandveld” vegetation types, a total of 305 species were observed, whilst it is estimated that at least 344 species could occur here. The “Sandveld” is also dominated by various Combretaceae (13.5 %), followed by the Poaceae (7.3 %) and Fabaceae (6.4%).

Conversely, the “Hardeveld” has a far higher diversity, with 404 observed species, and an estimated total of 444 species. These occur on diverse substrates, creating varied habitats and vegetation along the southern, western and north-western fringes, as well as in the far north-eastern parts where Karstveld elements occur in the Gam area. Here the Fabaceae dominate with 14.0 %, followed by the Anacardiaceae (12.4 %), Poaceae (11.6 %), Asteraceae (10.0 %) and Amaranthaceae (9.7 %). A detailed summary of species richness of the different vegetation associations is given in Table 1. The species composition of the different associations is presented in Strohbach (submitted) (see also Strohbach & Kutuahuripa, submitted).

**Table 1.** Observed and estimated species richness of various vegetation associations in the study area. ‘r’ is the median number of species per relevé, and ‘n’ the number of relevés sampled per association. These numbers have been used in the Jackknife procedure (Heltshe & Forrester, 1983) to obtain an estimate of the number of species per association.

Association	Observed	r	n	Estimated
1 <i>Acacio fleckii</i> – <i>Terminalietum prunioidis</i> thickets	92	30	17	120
2 <i>Acacio tortilis</i> – <i>Combretetum imberbis</i> woodlands	117	24	6	137
3 <i>Ptychobolus biflorus</i> – <i>Acacietum luederitzii</i> floodplain bushlands	107	46	6	145
4 <i>Eragrostis echinocloideae</i> – <i>Eriocphaloetum luederitziani</i> low shrublands	114	26	9	137
5 <i>Acacio melliferae</i> – <i>Catophractetum alexandri</i> shrublands	201	34	19	233
6 <i>Acacio melliferae</i> – <i>Hyphaenetum petersiana</i> thickets	143	43	8	181
7 <i>Panicum gilvum</i> – <i>Marsilea vley</i> community	26	26	1	26
8 <i>Eragrostis rigidioris</i> – <i>Urochloaetum brachyurae</i> grasslands	182	43	18	223
9 <i>Tarchonanthera camphorati</i> – <i>Acacietum eriolobae</i> bushlands	176	44	24	218
10.1 <i>Rhigozo brevispinosi</i> – <i>Acacietosum melliferae</i> shrublands	203	45	30	247
10.2 <i>Stipagrostis uniplumis</i> – <i>Acacietosum melliferae</i> shrublands	214	37	30	250
11 <i>Terminalia sericeae</i> – <i>Acacietum eriolobae</i> bushlands	171	42	18	211
<b>“Hardeveld” total</b>	<b>404</b>	<b>40</b>	<b>186</b>	<b>444</b>
12.1 <i>Acacio melliferae</i> – <i>Terminalietosum sericeae</i> shrublands	222	46	90	267
12.2 <i>Grewia flavae</i> – <i>Terminalietosum sericeae</i> shrublands	196	42	45	237
12.3 <i>Combretum collini</i> – <i>Terminalietosum sericeae</i> bushlands	185	39	61	223
12.4 <i>Burkea africanae</i> – <i>Terminalietosum sericeae</i> bushlands	145	32	40	176
13 <i>Terminalia sericeae</i> – <i>Schinziophytetum rautanenii</i> bushlands	95	34	6	123
14 <i>Burkea africanae</i> – <i>Pterocarpetum angolensis</i> bushlands	101	36	16	135
<b>“Sandveld” total</b>	<b>305</b>	<b>39</b>	<b>265</b>	<b>344</b>
<b>Grand total</b>	<b>442</b>	<b>39</b>	<b>451</b>	<b>481</b>

The fact that roughly 31 % of the species recorded for the study area were not observed during the vegetation survey can be attributed to the survey being done at a reconnaissance level only, in which most of the azonal vegetation (e.g. vleys, etc.) were ignored or at best under sampled. Yet the collections in the National Herbarium of Namibia (WIND) are also incomplete, with 20 QDS’s not sampled, and a further 43 QDS’s severely under sampled with fewer than 10 species recorded from these. Only one QDS, 2017CB Okakarara, can be considered well sampled with 157 species recorded for the QDS (Figure 3). The total number of species observed during the survey, combined with those from herbarium collections, exceeds the estimated number by 160 species. This highlights the incompleteness of both the herbarium collections and vegetation survey. Combined, at least 680 species are expected for the study area.



**Figure 3.** Distribution of collection intensity for the quarter degree squares (QDS's) within the study area.

Seventeen species are regarded as endemic (i.e. occurring only in Namibia), while an additional three species are near-endemic (i.e. occurring mostly in Namibia, with limited distribution in neighbouring countries). Only one species (*Pterocarpus angolensis*) is regarded as near-threatened due to over-exploitation (Loots, 2005), and 14 species are protected either under the Nature Conservation Ordinances (No's 37 of 1952 and 247 of 1977) or the Forestry Ordinance 37 of 1952 and Forestry Act 72 of 1968. The 23 alien species, of which three are regarded as weedy, and seven as invasive (i.e. of concern in habitat conservation) are of no conservation value.

## Conclusion

Two aspects regarding the biodiversity come to mind whilst analysing the data:

- (a) The study area is severely under sampled – both regarding relevés as well as herbarium records. This is evident from the fact that neither source provided a reasonably complete list of species, and even a combined list contained well under the estimated number of species.
- (b) Even though the study area is under sampled, this study showed that the diversity is substantially higher than estimated (Mendelsohn *et al.* 2002). The approach followed by Craven (2001) of classifying the diversity as “low-medium” is thus more appropriate. However, without comparative figures from similar studies elsewhere, it is difficult to judge exactly in what category this vegetation should be classed.

From the above it is clear that the initial survey done in 2004 needs to be intensified and expanded to get a full picture of species diversity in the area, and to manage the resource optimally.

The species diversity, as expressed in numbers of species or numbers of protected / endangered / endemic species, will, however, have little bearing on the overall need for conservation of this vegetation. Although we know little about the ecosystem functioning in this area, the poor nutritional status of the sandy soils (Strohbach & Kutuahuripa, submitted; Baillieul, 1975; Dougill & Thomas, 2004; Wang *et al.* 2007) may result in negative feedback loops associated with decreasing vegetative cover (Schlesinger *et al.* 1990). Such a compounding effect is predicted to lead to a rapid degradation of the vegetation and an ultimate remobilisation of the surface sands (i.e. leading to the formation of a true desert) (Midgley *et al.* 2005; Thomas *et al.* 2005). Thus measures by the Directorate of Forestry to curb illegal harvesting of wood (Hofmann, 2013) are

encouraging, and need to be implemented far more rigorously. Large-scale harvesting of shrubs for biofuel must also be avoided.

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## Appendix 1

**Annotated species list for the eastern communal conservancy areas Otjituuo, Okamatapati, Ozonahi, African Wilddog, Otjinene, Epukiro, Otjombinde, Omuramba Ua Mbinda, Eiseb and Ondjou, as well as the adjacent Otjinene and Epukiro farming areas**

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
<b>Pteridiophyta</b>													
<b>Aspleniaceae</b>													
	<i>Asplenium cordatum</i>			cr	mi	ve	is	fi					2017BC
<b>Dennstaedtiaceae</b>													
	<i>Microlepia speluncae</i>			cr	pl	ve	is	fi					2017CB
<b>Marsileaceae</b>													
	<i>Marsilea macrocarpa</i>		hl	cr/hy	mi	la	is/de			rare		occasional	
	<i>Marsilea nubica</i> var. <i>gymnocarpa</i>		hl	cr/hy	mi	la	is/de			rare		occasional	
	<i>Marsilea unicornis</i>			cr/hy	mi	la	is/de						2017CB
	<i>Marsilea vera</i>			cr/hy	mi	la	is/de						1918CD, 2118AB
	<i>Marsilea villifolia</i>			cr/hy	mi	la	is/de						2018CB
<b>Ophioglossaceae</b>													
	<i>Ophioglossum polyphyllum</i>		geo	hc	na	ve	is/de			occasional	rare	occasional	
<b>Angiospermae - Monocotyledonae</b>													
<b>Amaryllidaceae</b>													
	<i>Ammocharis coranica</i>		hl	cr	me	la	is/de	ro/pv		rare		occasional	
	<i>Boophane disticha</i>		hl	cr	me	ve	is/de	ro/pv		rare		rare	
	<i>Nerine laticoma</i>		geo	cr	No	la	is/de	pv		rare		occasional	
<b>Anthericaceae</b>													
	<i>Chlorophytum anceps</i>			cr	mi	ve	is	pv					2020AD
<b>Aponogetonaceae</b>													
	<i>Aponogeton desertorum</i>			cr	me	ve	is	pv	hy				2118AB

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
<b>Arecaceae</b>													
	<i>Hyphaene petersiana</i>		t2/ s1	ph	Mg	la	is	sc		rare		common	
<b>Asparagaceae</b>													
	<i>Asparagus cooperi</i>		s2	ch	Pi	ve	is	ro		common	common	occasional	
	<i>Asparagus nelsii</i>		s2	ch	Pi	ve	is	ro		common	common	occasional	
	<i>Asparagus suaveolens</i>		s2	ch	Pi	ve	is	ro		occasional	occasional	occasional	
<b>Asphodelaceae</b>													
	<i>Aloe hereroensis</i>	P/CII	s2	ch	Pl	ve	is	ro/so / su		rare		common	
	<i>Aloe zebrina</i>	P/CII		ch	Pl	la	is	ro/so / su					2020AB
	<i>Trachyandra laxa</i>		hl	hc	mi	ve	is	pv			rare	occasional	
<b>Colchicaceae</b>													
	<i>Androcymbium roseum</i>			cr	mi	ve	is	pv					2020BD, 2017CB
	<i>Camptorrhiza strumosa</i>			cr	mi	ve	is	pv					2118AA
	<i>Gloriosa superba</i>		geo	cr	mi	la	is/de	pv		rare	rare	rare	
	<i>Ornithoglossum vulgare</i>		geo	cr	no	ve	is/de	pv		rare	rare	occasional	
<b>Commelinaceae</b>													
	<i>Commelina africana</i> var. <i>krebsiana</i>		hl	th	mi	la	is	pv		occasional	common	occasional	
	<i>Commelina benghalensis</i>		hl	th	mi	la	is	pv		occasional	rare	occasional	
	<i>Commelina forskoolii</i>		hl	th	mi	la	is	pv		rare	rare	common	
	<i>Commelina livingstonii</i>		hl	th	mi	la	is	pv		rare	rare	occasional	
	<i>Commelina sublobata</i>			cr	na	la	is	pv					2020AD, 2118AA, 2017CB
<b>Cyperaceae</b>													
	<i>Bulbostylis hispidula</i>		hl	th	na	ve	is	pv		common	common	occasional	
	<i>Courtoisina assimilis</i>			th	mi	co	is	pv					2118AB, 2017CB
	<i>Cyperus amabilis</i>		hl	th	na	ve	is	pv		rare	rare	occasional	
	<i>Cyperus compressus</i>			th	mi	ve	is	pv					2017CB

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Cyperus difformis</i>			th	mi	ve	is	pv					2118AB, 2017CB
	<i>Cyperus fulgens</i>		hl	cr	mi	ve	is/de	pv		rare	rare	occasional	
	<i>Cyperus longus</i> var. <i>tenuiflorus</i>			cr	no	co	is	pv					2017CB
	<i>Cyperus margaritaceus</i>		hl	hc	mi	ve	is	pv		rare	occasional	rare	
	<i>Eleocharis atropurpurea</i>			th	mi	ve	is	pv					2118AB
	<i>Fuirena pubescens</i> var. <i>pubescens</i>			cr	mi	ve	is	pv					2020DB
	<i>Kyllinga alba</i>		hl	hc	mi	ve	is	pv		rare	rare	rare	
	<i>Mariscus confusus</i>		hl	cr	mi	ve	is/de	pv		rare	occasional	rare	
	<i>Pycreus chrysanthus</i>			cr	mi	ve	is	pv					2017CB, 2018CB
	<i>Pycreus macrostachyos</i>		hl	th	no	ve	is	pv		rare		common	
	<i>Schoenoplectiella leucantha</i>			th	na	ve	is	pv					2118AB
	<i>Schoenoplectiella praelongata</i>			th	mi	ve	is	pv	hy				2017CB
	<i>Schoenoplectus muricinux</i>		hl	th/hy	mi	ve	is	pv		rare		occasional	
	<i>Schoenoplectus senegalensis</i>		hl	th/hy	mi	ve	is	pv		rare		occasional	
<b>Dracaenaceae</b>													
	<i>Sansevieria aethiopica</i>		s2	hc	pl	ve	is	ro/so /pv		occasional	occasional	occasional	
	<i>Sansevieria pearsonii</i>		s2	hc	pl	ve	is	ro/so / su/pv		rare		occasional	
<b>Eriocaulaceae</b>													
	<i>Eriocaulon cinereum</i>			th	le	co	is	pv	hy				2020AD
<b>Eriospermaceae</b>													
	<i>Eriospermum mackeenii</i> subsp. <i>galpinii</i>			cr	mi	ve	is	pv					2017CB
<b>Hyacinthaceae</b>													
	<i>Albuca abyssinica</i>			cr	mi	ve	is	pv					2019CD
	<i>Dipcadi glaucum</i>			cr	pl	ve	is	pv					2018AA
	<i>Dipcadi longifolium</i>			cr	mi	co	is	pv					1918DB
	<i>Dipcadi marlothii</i>		hl	cr	mi	ve	is/de	Pv		rare	rare	rare	

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	<i>Drimia sanguinea</i>			cr	mi	ve	is	pv					2018AD, 2018CA, 2018CD, 2118AB
	<i>Ledebouria revoluta</i>			cr	me	ve	is	pv					2019BC
	<i>Ledebouria undulata</i>		geo	cr	mi	la	is/de	pv		rare		occasional	
	<i>Pseudogaltonia clavata</i>		geo	cr	me	ve	is/de	ro/pv		rare	rare	rare	
<b>Hydrocharitaceae</b>													
	<i>Lagarosiphon muscoides</i>			hc	le	la	is	pv	hy				2020AD
	<i>Ottelia ulifolia</i>			th	no	ve	is	pv	hy				2118AB
<b>Iridaceae</b>													
	<i>Babiana hypogea</i> var. <i>hypogea</i>			cr	mi	ve	is	pv					2120CC
	<i>Ferraria glutinosa</i>			cr	mi	ve	is	pv					2017DA
	<i>Gladiolus magnificus</i>			cr	no	ve	is	pv					1918DA, 2020AD
	<i>Lapeirousia bainesii</i>		geo	cr	mi	la	is/de	pv		occasional	rare	occasional	
	<i>Lapeirousia coerulea</i>			cr	mi	ve	is	pv					2017CB
	<i>Lapeirousia odoratissima</i>		geo	cr	mi	la	is/de	pv			rare	occasional	
<b>Orchideaceae</b>													
	<i>Eulophia speciosa</i>	P/CII		cr	no	ve	is	pv/su					2017BC
<b>Poaceae</b>													
	<i>Andropogon gayanus</i> var. <i>polycladus</i>			hc	mi	ve	is	pv					2020AD
	<i>Anthephora pubescens</i>		gp	hc	mi	ve	is	pv		rare	occasional	occasional	
	<i>Aristida adscensionis</i>		ga	th	mi	co	is	pv		common	rare	common	
	<i>Aristida congesta</i> subsp. <i>congesta</i>		gp	hc	mi	co	is	pv		common	common	common	
	<i>Aristida effusa</i>		ga	th	mi	co	is	pv		occasional	rare	common	
	<i>Aristida hordeacea</i>			th	mi	ve	is	pv					2017CB
	<i>Aristida meridionalis</i>		gp	hc	mi	co	is	pv		rare	occasional	common	
	<i>Aristida pilgeri</i>		gp	hc	mi	co	is	pv		rare	rare	occasional	
	<i>Aristida rhiniochloa</i>		ga	th	mi	co	is	pv		occasional	rare	common	
	<i>Aristida stipitata</i>		ga	th	mi	co	is	pv		rare	common	occasional	

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	<i>Aristida stipoides</i>		ga	th	mi	co	is	pv		occasional	rare	common	
	<i>Brachiaria deflexa</i>		ga	th	mi	co	is	pv		occasional		occasional	
	<i>Brachiaria eruciformis</i>			th	na	ve	is	pv					2017CB
	<i>Brachiaria grossa</i>			th	mi	ve	is	pv					2017CB
	<i>Brachiaria malacodes</i>			th	mi	co	is	pv					1918DA
	<i>Brachiaria marlothii</i>		ga	th	mi	co	is	pv		rare		common	
	<i>Brachiaria nigropedata</i>		gp	hc	mi	ve	is	pv		occasional	occasional	common	
	<i>Cenchrus biflorus</i>			th	mi	co	is	pv					2119BD
	<i>Cenchrus ciliaris</i>		gp	hc	mi	co	is	pv		occasional		common	
	<i>Chloris virgata</i>		ga	th	mi	co	is	pv		occasional		common	
	<i>Cymbopogon caesius</i>		gp	hc	mi	co	is	pv		rare		occasional	
	<i>Cymbopogon pospichilii</i>		gp	hc	mi	co	is	pv		rare		occasional	
	<i>Cynodon dactylon</i>	Weed	gp	hc	na	ve	is	pv		rare		common	
	<i>Dactyloctenium aegyptium</i>		ga	th	mi	co	is	pv		occasional		occasional	
	<i>Dactyloctenium giganteum</i>		ga	th	mi	co	is	pv		rare	rare	common	
	<i>Diandrochloa pusilla</i>		ga	th	mi	ve	is	pv		rare		common	
	<i>Digitaria milanjana</i>			hc	na	ve	is	pv					2119AB
	<i>Digitaria seriata</i>		gp	hc	mi	ve	is	pv		occasional	common	occasional	
	<i>Digitaria velutina</i>		ga	th	mi	co	is	pv		rare	rare	occasional	
	<i>Dinebra retroflexa var. condensata</i>			th	mi	co	is	pv					2017CB
	<i>Echinochloa holubii</i>			hc	mi	co	is	pv	hy				2118AA, 2017CB
	<i>Elionurus tripsacoides</i>		s2	hc	mi	co	is	pv			rare	occasional	
	<i>Elytrophorus globularis</i>			th	mi	ve	is	pv	hy				1918CD, 2118AB, 2017CB
	<i>Enneapogon cenchroides</i>		ga	th	mi	co	is	pv		occasional	rare	common	
	<i>Enneapogon desvauxii</i>		ga	th	le	ve	is	pv		occasional		common	
	<i>Enneapogon scoparius</i>		gp	hc	mi	co	is	pv		rare		occasional	
	<i>Eragrostis annulata</i>		ga	th	mi	co	is	pv		rare		occasional	

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	<i>Eragrostis aspera</i>		ga	th	mi	co	is	pv		rare		occasional	
	<i>Eragrostis biflora</i>		ga	th	mi	co	is	pv		occasional	rare	occasional	
	<i>Eragrostis cylindriflora</i>		ga	th	mi	co	is	pv		rare		occasional	
	<i>Eragrostis dinteri</i>		ga	th	mi	ve	is	pv		common	common	common	
	<i>Eragrostis echinochloidea</i>		gp	hc	mi	co	is	pv		rare		common	
	<i>Eragrostis glandulosipedata</i>			th	na	co	is	pv					2119AB
	<i>Eragrostis jeffreysii</i>		gp	hc	mi	co	is	pv		rare	occasional	occasional	
	<i>Eragrostis lehmanniana</i>		gp	hc	mi	co	is	pv		occasional	common	common	
	<i>Eragrostis nindensis</i>		gp	hc	na	ve	is	pv		occasional	rare	occasional	
	<i>Eragrostis omahenkensis</i>	En	ga	th	mi	co	is	pv		occasional	occasional	common	
	<i>Eragrostis pallens</i>		gp	hc	mi	co	is	pv		rare	common	occasional	
	<i>Eragrostis pilgeriana</i>		ga	th	na	la	is	pv		rare		common	
	<i>Eragrostis porosa</i>		ga	th	mi	co	is	pv		common	occasional	common	
	<i>Eragrostis rigidior</i>		gp	hc	mi	co	is	pv/sc		common	common	common	
	<i>Eragrostis rotifer</i>		ga	th	mi	co	is	pv		rare		common	
	<i>Eragrostis trichophora</i>		gp	hc	mi	co	is	pv		common	occasional	common	
	<i>Eragrostis truncata</i>		gp	hc	na	ve	is	pv		rare		common	
	<i>Eragrostis viscosa</i>		ga	th	mi	co	is	pv		occasional	rare	occasional	
	<i>Eriochloa fatmensis</i>			th	mi	co	is	pv					2017CB
	<i>Fingerhuthia africana</i>			hc/(th)	na	co	is	pv					2118AB, 2017CB
	<i>Heteropogon contortus</i>		gp	hc	mi	co	is	pv		rare		common	
	<i>Imperata cylindrica</i>			hc/cr	no	ve	is	pv					2020BA
	<i>Megaloptachne albescens</i>		ga	th	mi	co	is	pv		occasional	common	common	
	<i>Melinis repens</i> subsp. <i>grandiflora</i>		ga	th	mi	co	is	pv		common	common	common	
	<i>Melinis repens</i> subsp. <i>repens</i>		gp	hc	mi	co	is	pv		rare	common	occasional	
	<i>Microchloa caffra</i>		gp	hc	na	ve	is	pv		rare		rare	
	<i>Oropetium capense</i>		gp	hc	le	ve	is	pv		rare		occasional	
	<i>Oryzidium barnardii</i>			hc	mi	co	is	pv	hy				2017CB

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					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Panicum coloratum</i>		gp	hc	mi	ve	is	pv		rare	rare	common	
	<i>Panicum gilvum</i>		ga	hc/hy	mi	ve	is	pv		rare		common	
	<i>Panicum kalahareense</i>		gp	hc	mi	co	is	pv		rare	occasional	occasional	
	<i>Panicum lanipes</i>		gp	hc	mi	ve	is	pv		rare		occasional	
	<i>Panicum maximum</i>		gp	hc	mi	co	is	pv		occasional	rare	occasional	
	<i>Panicum pilgerianum</i>			th	mi	co	is	pv	hy				1918CD
	<i>Panicum simulans</i>	En		th	mi	co	is	pv					2017CB
	<i>Perotis patens</i>		ga	th	mi	co	is	pv		rare	rare	rare	
	<i>Pogonarthria fleckii</i>		ga	th	mi	co	is	pv		common	occasional	common	
	<i>Pogonarthria squarrosa</i>		gp	hc	mi	ve	is	pv		rare	common	occasional	
	<i>Schmidtia kalihariensis</i>		ga	th	mi	la	is	pv		rare		occasional	
	<i>Schmidtia pappophoroides</i>		gp	hc	mi	la	is	pv		common	common	common	
	<i>Setaria pumila</i>		ga	th	mi	co	is	pv		rare		rare	
	<i>Setaria sagitifolia</i>		ga	th	mi	co	is	pv		rare		occasional	
	<i>Setaria verticillata</i>		ga	th	mi	co	is	pv		occasional		occasional	
	<i>Sorghum halepense</i>	weed		hc	mi	co	is	pv					2017CB
	<i>Sporobolus fimbriatus</i>		gp	hc	mi	co	is	pv		rare		occasional	
	<i>Sporobolus ioclados</i>		gp	hc	mi	co	is	pv		rare		common	
	<i>Sporobolus panicoides</i>		ga	th	mi	co	is	pv		rare		occasional	
	<i>Stipagrostis anomala</i>			hc/th	na	co	is	pv					1918DD
	<i>Stipagrostis hirtigluma</i>		ga	th	mi	co	is	pv		rare		occasional	
	<i>Stipagrostis uniplumis</i> var. <i>uniplumis</i>		gp	hc	mi	co	is	pv		common	wide-spread	common	
	<i>Tragus berteronianus</i>		ga	hc	mi	ve	is	pv		common	rare	occasional	
	<i>Tragus racemosus</i>		ga	th	na	la	is	pv		occasional	rare	occasional	
	<i>Tricholaena monachne</i>		ga	th	mi	co	is	pv		rare	occasional	rare	
	<i>Trichoneura grandiglumis</i>		ga	th	na	la	is	pv		rare		common	
	<i>Triraphis purpurea</i>		ga	th	mi	co	is	pv		occasional	rare	common	



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	<i>Triraphis schinzii</i>		gp	hc	mi	co	is	pv		rare	occasional	rare	
	<i>Urochloa brachyura</i>		ga	th	mi	co	is	pv		common	common	common	
	<i>Urochloa mosambicensis</i>			hc	mi	co	is	pv					2017CB
	<i>Urochloa oligotricha</i>			hc	no	co	is	pv					2017CB
	<i>Urochloa trichopus</i>			th	mi	co	is	pv					2017CB
	<i>Willkommia sarmentosa</i>			hc	na	co	is	pv					2017CB
<b>Tecophilaeaceae</b>													
	<i>Walleria nutans</i>		geo	cr	na	ve	is	pv		occasional	occasional	occasional	
<b>Velloziaceae</b>													
	<i>Xerophyta humilis</i>		hl	cr	na	ve	is	ro		rare		occasional	
<b>Angiospermae - Dicotyledonae</b>													
<b>Acanthaceae</b>													
	<i>Barleria albi-pilosa</i>		hl	ch	Mi	pe	is/de			rare		rare	
	<i>Barleria kaloxytone</i>	En		ch	mi	ve	is						1918DA
	<i>Barleria lanceolata</i>	En	s2	ch	mi	pe	is/de			rare		occasional	
	<i>Barleria lancifolia</i>		hl	ch	mi	pe	is/de			rare		occasional	
	<i>Barleria macrostegia</i>		hl	ch	mi	pe	is/de			occasional	rare	occasional	
	<i>Barleria senensis</i>		hl	ch	mi	pe	is/de			occasional		occasional	
	<i>Blepharis diversispina</i>			ch	na	ve	is						2017DA, 2017BC, 2017DD, 2020BD, 2020CC, 2119AA, 2019CD, 2019DA, 2119AB, 2017CB, 2018CB
	<i>Blepharis integrifolia</i>		hl	th	mi	la	is			occasional	rare	occasional	
	<i>Blepharis maderaspatensis</i>		hl	th	mi	la	is			rare	rare	rare	
	<i>Blepharis mitrata</i>			th	na	ve	is						2120DC
	<i>Blepharis obmitrata</i>		hl	th	mi	la	is			occasional	occasional	occasional	

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	<i>Hypoestes forskoolii</i>		hl	th	mi	la	is			rare	rare	common	
	<i>Justicia betonica</i>			ph	no	pe	is						2017CB
	<i>Justicia exigua</i>			th	na	ve	is						2118AB, 2017CB
	<i>Justicia odora</i>		s2	ch	mi	la	is			rare		common	
	<i>Monechma debile</i>		hl	th	mi	la	is			rare	rare	occasional	
	<i>Monechma divaricatum</i>		hl	th	mi	la	is			occasional	rare	occasional	
	<i>Peristrophe hereroensis</i>	En	hl	hc	mi	la	is/de			rare		occasional	
	<i>Petalidium engleranum</i>		s2	ch	mi	la	do			rare		occasional	
	<i>Ruellia species</i>		hl	th	mi	la	is			rare		rare	
	<i>Ruellia damarensis</i>	En		ch	na	ve	is						2118AA, 2118AB
	<i>Thunbergia aurea</i>		hl	th/li	mi	la	is				rare	common	
<b>Aizoaceae</b>													
	<i>Aizoon virgatum</i>		s2	ch	na	la	is	sc		rare		occasional	
	<i>Galenia secunda</i>			ch	le	is	ve	Su					2120DD
	<i>Plinthus sericeus</i>		hl	cr	mi	la	is			rare		occasional	
	<i>Tetragonia calycina</i>			ch	na	la	is	su					2017CB
	<i>Trianthema parvifolia</i>			th	le	la	is	su					2119AB
<b>Amaranthaceae</b>													
	<i>Achyranthes aspera</i> var. <i>aspera</i>	Nat		ch	no	la	is						2017DA, 2017BC, 2118AB
	<i>Achyranthes aspera</i> var. <i>sicula</i>	Nat	hl	th	mi	la	is			occasional	rare	occasional	
	<i>Aerva leucura</i>		s2	ch	mi	la	do			rare		occasional	
	<i>Alternanthera nodiflora</i>	Nat		th	na	la	is						2017CB
	<i>Alternanthera pungens</i>	Nat	hl	th	mi	la	is			rare		occasional	
	<i>Amaranthus thunbergii</i>		hl	th	mi	la	is			rare	rare	occasional	
	<i>Guilleminea densa</i>		hl	th	mi	la	is			rare		common	
	<i>Hermbstaedia argenteiformis</i>			th	mi	ve	is						2017DA, 2018BD
	<i>Hermbstaedia fleckii</i>		hl	th	mi	la	is				rare	occasional	

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					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Hermbstaedtia linearis</i>			th	na	ve	is						2020AD, 2118AB
	<i>Hermbstaedtia odorata</i>		hl	th	mi	la	is			occasional	rare	occasional	
	<i>Hermbstaedtia scabra</i>			th	mi	ve	is						1918DC
	<i>Kyphocarpa angustifolia</i>		hl	th	mi	la	is			common	occasional	occasional	
	<i>Leucosphaera bainesii</i>		s2	ch	mi	la	do			rare		common	
	<i>Nelsia quadrangula</i>			th	mi	la	is						2119AB
	<i>Pupalia lappacea</i>	Nat	hl	th	mi	la	is			common	rare	occasional	
	<i>Sericorema remotiflora</i>		hl	th	le	la	is			rare	rare	occasional	
	<i>Sericorema sericea</i>		hl	th	le	la	is			occasional		occasional	
<b>Anacardiaceae</b>													
	<i>Lannea discolor</i>		t3	ph	no	la	do/de				rare	occasional	
	<i>Ozoroa crassinervia</i>			ph	no	la	do/de						2120CA
	<i>Ozoroa insignis</i>			ph	la	do	de/do						2120CA
	<i>Ozoroa paniculosa</i>		s1	ch	no	la	do/de			occasional	occasional	common	
	<i>Ozoroa schinzii</i>	NEn	s1	ch	no	la	do/de				rare	common	
	<i>Searsia marlothii</i>		s1	ph	no	la	is			rare	rare	occasional	
	<i>Searsia tenuinervis</i>		s1/2	ch	no	la	is			common	occasional	occasional	
<b>Annonaceae</b>													
	<i>Annona stenophylla</i> subsp. <i>nana</i>			ch	no	ve	is						2020AD
<b>Apiaceae</b>													
	<i>Deverra burchellii</i>			ch	mi	ve	is						2017DA
	<i>Steganotenia aralacea</i>		t3/ s1	ph	me	la	is/de	fi			rare	common	
<b>Apocynaceae</b>													
	<i>Baissea wulfhorstii</i>		hl	cr/li	no	la	is	fi			occasional	common	
	<i>Brachystelma cupulatum</i>			cr	na	ve	is						2118AB
	<i>Ceropegia lugardiae</i>	P	geo	ch/li	mi	la	is	su			rare	occasional	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Cryptolepis oblongifolia</i>			ch	na	ve	is						2018BA, 2019AB, 2019AC
	<i>Cynanchum orangeanum</i>		geo	cr	mi	la	is/de	fi		rare		occasional	
	<i>Diplorhynchus condylocarpon</i>		s1	ph	no	pe	is				rare	common	
	<i>Fockea angustifolia</i>		geo	cr	mi	la	is/de	sc		rare	rare	occasional	
	<i>Gomphocarpus tomentosus</i>		hl	ch	mi	ve	do			rare	rare	occasional	
	<i>Marsdenia sylvestris</i>		s1	ph/li	no	la	is			rare		occasional	
	<i>Orphanthera jasminiflora</i>			cr	mi	la	is						1918DC
	<i>Pentarrhinum insipidum</i>			th	mi	pe	is						1918DA
	<i>Pergularia daemia</i>		hl	ch/li	no	la	is			occasional	occasional	occasional	
	<i>Raphionacme velutina</i>		geo	cr	mi	la	is/de			occasional	occasional	occasional	
	<i>Sarcostemma viminale</i>		s2	ch/li	pl	ve	is	so/su		occasional	occasional	occasional	
	<i>Tavaresia barklyi</i>	P	hl	ch	pl	ve	is	so/su		rare	rare	rare	
<b>Asteraceae</b>													
	<i>Acanthospermum hispidum</i>	Inv	hl	th	mi	la	is			rare	rare	occasional	
	<i>Bidens biternata</i>	Inv	hl	th	mi	la	is			rare	rare	rare	
	<i>Bidens pilosa</i>	Inv	hl	th	mi	la	is					rare	
	<i>Calostephane divaricata</i>		hl	th	mi	ve	is			rare		occasional	
	<i>Conyza aegyptiaca</i>			th	na	la	is						2017CB
	<i>Conyza albida</i>	Inv		hc	na	la	is						2019CB, 2019DA
	<i>Cotula anthemoides</i>			th	na	co	is						2017CB
	<i>Dicoma schinzii</i>		hl	th	mi	la	do			common	common	occasional	
	<i>Dicoma tomentosa</i>		hl	th	mi	ve	do			occasional	rare	occasional	
	<i>Emilia ambifaria</i>			th	mi	ve	is	su					2020BB, 2017CB
	<i>Eriocephalus luederitzianus</i>		s2	ch	pi	la	is	sc		rare		occasional	
	<i>Erlangea misera</i>		hl	th	mi	la	is			rare	rare	occasional	
	<i>Felicia anthemidodes</i>			th	na	ve	is						2119AB
	<i>Felicia clavipilosa</i> subsp. <i>clavipilosa</i>		s2	th	le	la	is			occasional	rare	occasional	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Felicia muricata</i> subsp. <i>muricata</i>			ch	le	ve	is						2120CC, 2119AB
	<i>Felicia smaragdina</i>	En		th	le	co	is						2017CB
	<i>Flaveria bidentis</i>	Inv	hl	th	mi	la	is			rare		occasional	
	<i>Geigeria odontoptera</i>	En		th	mi	la	is						2018BD
	<i>Geigeria ornativa</i>		hl	th	mi	ve	is			occasional	rare	occasional	
	<i>Geigeria schinzii</i> subsp. <i>schinzii</i>			hc	mi	co	is						2017CB
	<i>Helichrysum argyrosphaerum</i>		hl	th	na	la	do			rare		occasional	
	<i>Helichrysum candolleianum</i>		hl	th	na	la	do				rare	occasional	
	<i>Helichrysum cerastioides</i>			hc	na	co	is						2119AA
	<i>Helichrysum lineare</i>			hc	le	co	is						2018BA
	<i>Hirpicium gazanioides</i>		hl	th	mi	la	is			occasional	rare	occasional	
	<i>Kleinia longiflora</i>		s2	ch	me	ve	is	so/su		common	occasional	occasional	
	<i>Laggera decurrens</i>			hc	na	co	is						2020CA, 2119AB, 2017CB
	<i>Nicolasia nitens</i> var. <i>nitens</i>			th	na	co	is						2017CB
	<i>Nidorella resedifolia</i>			th	na	ve	is						1918DC, 2017CB, 2018BD, 2018CB, 2019BC, 2019CD, 2020CA
	<i>Nolletia gariepina</i>		hl	ch	le	la	is				rare	occasional	
	<i>Nolletia tenuifolia</i>	En	s2	ch	le	la	is			rare	rare	occasional	
	<i>Pegolettia senegalensis</i>		hl	th	le	la	is			rare	rare	occasional	
	<i>Pentzia calcarea</i>			ch	le	la	is						2017BC
	<i>Pentzia pinnatisecta</i>			ch	na	ve	is						2119DA
	<i>Philyrophyllum schinzii</i>			hc	mi	la	is						2017DA, 2020AD
	<i>Polydora poskeana</i>		hl	th	na	ve	do			common	common	common	
	<i>Sphaeranthus peduncularis</i> subsp. <i>rogersii</i>			hc	na	ve	is						2017CB
	<i>Tagetes minuta</i>	Inv	hl	th	mi	la	is	fi		rare		occasional	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Tarchonanthus camphoratus</i>		s1	ph	no	ve	do			occasional	occasional	common	
	<i>Vernonia fastigiata</i>		hl	th	na	ve	do			rare		occasional	
<b>Bignoniaceae</b>													
	<i>Catophractes alexandri</i>		s1	ph	mi	la	do			occasional	rare	common	
	<i>Rhigozum brevispinosum</i>		s1	th	na	la	is			common	common	common	
<b>Boraginaceae</b>													
	<i>Ehretia alba</i>		s1	ch	mi	la	is/de	sc		common	occasional	occasional	
	<i>Heliotropium ciliatum</i>			hc	na	la	is						2017CB, 2018BD, 2118AA, 2120CA
	<i>Heliotropium marifolium</i>		hl	th	na	la	do			rare		rare	
	<i>Heliotropium nelsonii</i>			hc	na	la	is						2017DA
	<i>Heliotropium ovalifolium</i>		hl	ph	mi	la	is			rare		occasional	
	<i>Heliotropium steudneri</i>		hl	th	na	la	do			occasional	occasional	occasional	
	<i>Heliotropium strigosum</i> subsp. <i>strigosum</i>			th	na	la	is						1918DA
<b>Brassicaceae</b>													
	<i>Lepidium africanum</i> subsp. <i>divaricatum</i>			hc	na	la	is						2119AB
	<i>Lepidium desertorum</i>			th	na	la	is						2119AB
<b>Burseraceae</b>													
	<i>Commiphora africana</i>		s1	ch	no	la	is/de	ct		occasional	occasional	occasional	
	<i>Commiphora angolensis</i>		s1	ch	mi	la	is/de	ct		common	common	common	
	<i>Commiphora glandulosa</i>			ph	mi	co	is	ct					1918CD
	<i>Commiphora pyracanthoides</i>		t3	ph	mi	la	is/de	ct		common	rare	common	
	<i>Commiphora tenuipetiolata</i>		s2	ph	no	la	is/de	ct		rare	rare	common	
<b>Cactaceae</b>													
	<i>Opuntia</i> species	Inv	s2	ch	pl	ve	is	so/su		rare		occasional	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
<b>Capparaceae</b>													
	<i>Boscia albitrunca</i>	F	t3	ph	mi	la	is	sc		common	common	common	
	<i>Boscia foetida</i>		s1	ph	na	la	is	sc		rare		common	
	<i>Cleome angustifolia</i> subsp. <i>petersiana</i>			th	le	la	is						2020CA
	<i>Cleome gynandra</i>			th	mi	la	is						2017CB, 2018CB
	<i>Cleome monophylla</i>			th	mi	la	is						2018CB
	<i>Cleome oxyphylla</i>			th	mi	la	is						1918CD
	<i>Cleome rubella</i>		hl	th	na	la	is			common	common	occasional	
	<i>Maerua juncea</i>		s2	ph	mi	pe	is	sc		rare	rare	occasional	
	<i>Maerua schinzii</i>	F	t3/ s1	ph	mi	la	is			rare		occasional	
<b>Caryophyllaceae</b>													
	<i>Pollichia campestris</i>		s2	ch	le	la	is			common	occasional	occasional	
	<i>Polycarpaea corymbosa</i>		hl	th	le	la	is			rare		rare	
<b>Celastraceae</b>													
	<i>Elaeodendron transvaalense</i>		t3	ph	mi	la	is	sc		rare		common	
	<i>Gymnosporia buxifolia</i>		s1	ch	mi	la	is	sc		rare		occasional	
	<i>Gymnosporia senegalensis</i>		s1	ch	mi	la	is	sc		occasional	rare	common	
	<i>Salacia luebbertii</i>		geo	cr	me	la	do/de	fi			occasional	common	
<b>Chenopodiaceae</b>													
	<i>Chenopodium petiolariforme</i>		hl	th	mi	la	is			rare		occasional	
	<i>Chenopodium pumilio</i>	Nat	hl	th	na	la	is			rare		occasional	
	<i>Salsola tuberculata</i>		s2	ch	pi	la	is	ro		rare		common	
<b>Combretaceae</b>													
	<i>Combretum apiculatum</i> subsp. <i>apiculatum</i>		s1	ph	no	la	is			rare	rare	occasional	
	<i>Combretum apiculatum</i> subsp. <i>leutweinii</i>			ph	no	la	is						2017CB
	<i>Combretum collinum</i>		t3	ph	no	la	is/de			occasional	common	common	
	<i>Combretum engleri</i>		s1	ph	mi	la	is/de			rare	occasional	rare	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Combretum hereroense</i>		s1	ph	mi	la	do/de			occasional	rare	common	
	<i>Combretum imberbe</i>		t2	ph	mi	la	do			rare		common	
	<i>Combretum psidioides</i>		t3/ s1	ph	mi	la	is/de				common	common	
	<i>Combretum zeyheri</i>		t2/3	ph	no	la	is				rare	common	
	<i>Terminalia prunioides</i>		t1-s1	ph	mi	la	is/de			occasional		common	
	<i>Terminalia sericea</i>		s1	ph	no	la	do/de			occasional	wide-spread	common	
<b>Convolvulaceae</b>													
	<i>Evolvulus alsinoides</i>		hl	th	na	la	is			common	common	occasional	
	<i>Ipomoea adenioides</i>		s2	ch	no	la	is/de	sc		rare		occasional	
	<i>Ipomoea bolusiana</i>		hl	cr/li	mi	la	is/de			occasional	occasional	occasional	
	<i>Ipomoea chloroneura</i>		hl	th	mi	la	is			occasional	common	common	
	<i>Ipomoea coptica</i>		hl	th/li	mi	la	is			occasional	rare	occasional	
	<i>Ipomoea coscinosperma</i>		hl	cr/li	mi	la	is/de			rare		rare	
	<i>Ipomoea crassipes</i>		hl	cr/li	mi	la	is/de			rare		rare	
	<i>Ipomoea hackeliana</i>		hl	th/li	mi	la	is			occasional	common	common	
	<i>Ipomoea hochstetteri</i>		hl	th/li	mi	la	is			rare	rare	occasional	
	<i>Ipomoea holubii</i>			ch/li	mi	pe	is						1918DC
	<i>Ipomoea magnusiana</i>		hl	cr/li	mi	la	is/de			occasional	common	occasional	
	<i>Ipomoea oblongata</i>		hl	cr/li	no	la	is/de			occasional	rare	common	
	<i>Ipomoea obscura</i>		hl	th/li	mi	la	is			occasional	common	occasional	
	<i>Ipomoea sinensis</i> subsp. <i>blepharosepala</i>		hl	th/li	mi	la	is			rare		common	
	<i>Ipomoea verbascoidea</i>		hl	ch/li	no	la	do/de			rare	occasional	occasional	
	<i>Ipomoea welwitschii</i>		hl	cr/li	no	la	do/de	sc		rare	rare	occasional	
	<i>Jacquemontia tamnifolia</i>		hl	th/li	mi	la	is			rare	rare	occasional	
	<i>Merremia palmata</i>			hc/li	no	la	is						2020AD
	<i>Merremia verecunda</i>		hl	cr/li	mi	la	is/de			common	common	occasional	
	<i>Seddera suffruticosa</i>		s2	th	na	la	is			occasional		occasional	



Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Xenostegia tridentata</i> subsp. <i>angustifolia</i>		hl	th/li	mi	la	is			occasional	common	occasional	
<b>Crassulaceae</b>													
	<i>Kalanchoe brachyloba</i>		hl	ch	no	la	is	su		rare		occasional	
	<i>Kalanchoe lanceolata</i>		hl	th	mi	la	is	su		occasional	rare	occasional	
	<i>Kalanchoe rotundifolia</i>		hl	th	mi	la	is	su		rare		occasional	
<b>Cucurbitaceae</b>													
	<i>Acanthosicyos naudinianus</i>		hl	cr/li	no	la	is/de			common	common	common	
	<i>Citrullus lanatus</i>		hl	th/li	me	la	is			occasional	occasional	occasional	
	<i>Coccinia sessilifolia</i>			hc/li	no	ve	is						2020CA
	<i>Corallocarpus bainesii</i>			hc/li	no	ve	is	su					1918DA, 2019DC
	<i>Corallocarpus schinzii</i>			hc/li	mi	pe	is	su					2018CB, 2020CA
	<i>Corallocarpus triangularis</i>		hl	cr/li	mi	la	is/de			rare	rare	occasional	
	<i>Cucumis africanus</i>		hl	th/li	no	la	is			rare	rare	occasional	
	<i>Cucumis anguria</i> var. <i>longaculeatus</i>			th/li	no	la	is						2020CA
	<i>Cucumis humifructus</i>			th/li	me	la	is						1918DA
	<i>Cucumis kalahariensis</i>		hl	th/li	no	la	is			rare	rare	occasional	
	<i>Cucumis meeusei</i>		hl	th/li	no	la	is			rare		occasional	
	<i>Dactyliandra welwitschii</i>		hl	th/li	mi	la	is			rare		rare	
	<i>Momordica balsamina</i>		hl	cr/li	mi	la	is/de			occasional	common	occasional	
	<i>Trochomeria debilis</i>		hl	cr/li	no	la	is/de			rare	rare	occasional	
	<i>Trochomeria macrocarpa</i> subsp. <i>vitifolia</i>		hl	cr/li	no	la	is/de			rare		rare	
	<i>Zehneria marlothii</i>		hl	th/li	mi	la	is			rare	rare	occasional	
<b>Dichapetalaceae</b>													
	<i>Dichapetalum cymosum</i>		s2	cr	no	ve	is			rare	occasional	occasional	
<b>Ebenaceae</b>													
	<i>Diospyros lycioides</i>		s1	ch	mi	la	do			rare	rare	occasional	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Euclea undulata</i>			ph	na	ve	is						2017DA
<b>Euphorbiaceae</b>													
	<i>Acalypha ciliata</i>			th	mi	la	is						2017CB
	<i>Acalypha indica</i>		hl	th	mi	la	is			rare		occasional	
	<i>Acalypha segetalis</i>		hl	th	mi	la	is			rare	rare	occasional	
	<i>Cephalocroton mollis</i>		s2	ch	no	la	is/de			occasional	rare	occasional	
	<i>Croton gratissimus</i>		s1	ph	no	pe	do			occasional	common	common	
	<i>Euphorbia austro-occidentalis</i>			hc	le	la	is						1918DD, 2020AD, 2019AC, 2019DA, 2119AB
	<i>Euphorbia crotonoides</i>		hl	th	na	la	is				rare	occasional	
	<i>Euphorbia forskalii</i>		hl	th	le	la	is			rare	rare	rare	
	<i>Euphorbia hirta</i>			th	na	la	is						2017CB
	<i>Euphorbia inaequilatera</i>		hl	th	mi	la	is			common	occasional	occasional	
	<i>Euphorbia prostrata</i>	weed		th	le	la	is						2119DA
	<i>Euphorbia spartaria</i>	En	s2	ch	no	ve	is	so/su		rare	rare	common	
	<i>Flueggea virosa</i> subsp. <i>virosa</i>			ph	na	la	is						2017BC, 2017CB
	<i>Jatropha erythropoda</i>		hl	cr	mi	la	is/de			rare	rare	rare	
	<i>Phyllanthus maderaspatensis</i>		hl	hc	na	la	is			occasional	rare	occasional	
	<i>Phyllanthus omahekensis</i>		hl	th	na	la	is			rare	occasional	rare	
	<i>Phyllanthus pentandrus</i>		hl	th	na	la	is			common	common	occasional	
	<i>Schinziophyton rautanenii</i>		t1	ph	ma	la	do/de				rare	common	
	<i>Tragia dioica</i>		hl	th/li	mi	la	is			occasional	occasional	occasional	
	<i>Tragia lancifolia</i>	En		ch	mi	la	is						2017CB, 2019AC
	<i>Tragia okanyua</i>		hl	th/li	mi	la	is			rare		rare	
<b>Fabaceae</b>													

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Acacia ataxacantha</i>		s1	ph	no	la	is/de	fi		rare	common	common	
	<i>Acacia erioloba</i>	F	t2	ph	mi	la	is/de	fi		common	occasional	common	
	<i>Acacia erubescens</i>			ph	na	pe	is	de					2020BB
	<i>Acacia fleckii</i>		t3	ph	no	la	is/de	fi		common	common	common	
	<i>Acacia hebeclada</i> subsp. <i>hebeclada</i>		s1	ph	mi	la	is	fi		common	rare	common	
	<i>Acacia karroo</i>		s1	ph	mi	la	is/de	fi		rare		common	
	<i>Acacia luederitzii</i>		t2	ph	mi	la	is/de	fi		common	occasional	common	
	<i>Acacia mellifera</i> subsp. <i>detinens</i>		s1	ph	mi	la	is/de	fi		Wide-spread	common	common	
	<i>Acacia nebrownii</i>		s1	ph	mi	la	is/de	fi		rare		common	
	<i>Acacia tortilis</i> subsp. <i>heteracantha</i>		t2	ph	mi	la	is/de	fi		occasional	rare	common	
	<i>Albizia anthelmintica</i>		t2	ph	mi	la	is/de	fi		occasional	rare	common	
	<i>Baphia massaiensis</i> subsp. <i>obovata</i> var. <i>obovata</i>		s1	ph	no	la	is/de				rare	common	
	<i>Bauhinia petersiana</i> subsp. <i>macrantha</i>		s1	ph	me	la	is/de			occasional	common	common	
	<i>Bolusia amboensis</i>	En		th	mi	co	is						2018CB, 2019BC
	<i>Burkea africana</i>	F	t2	ph	no	la	is/de	fi			common	common	
	<i>Chamaecrista biensis</i>		hl	th	mi	la	is	fi		rare	common	rare	
	<i>Chamaecrista absus</i>		hl	th	mi	la	is			occasional	rare	occasional	
	<i>Chamaecrista falcinella</i> var. <i>parviflora</i>		hl									occasional	
	<i>Crotalaria barkae</i> subsp. <i>barkae</i>			th	mi	ve	is						2017CB
	<i>Crotalaria damarensis</i>			th	mi	ve	is						1918CD
	<i>Crotalaria flavicarinata</i>		hl	th	mi	la	is	fi		rare	rare	common	
	<i>Crotalaria piscarpa</i>		hl	th	mi	la	is	fi		rare	rare	occasional	
	<i>Crotalaria platysepala</i>			th	na	ve	is						2020CA
	<i>Crotalaria podocarpa</i>		hl	th	mi	la	is	fi		occasional	rare	occasional	
	<i>Crotalaria sphaerocarpa</i>		hl	th	mi	la	is	fi		occasional	occasional	common	
	<i>Crotalaria steudneri</i>		hl	th	mi	la	is	fi		rare		common	
	<i>Cyamopsis senegalensis</i>			th	mi	ve	is						2017CB

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Cyamopsis serrata</i>		hl	th	mi	la	is	fi		rare	rare	occasional	
	<i>Dichrostachys cinerea</i>		t3/ s1	th	mi	ve	is	pv		common	common	common	
	<i>Elephantorrhiza elephantina</i>		s2	cr	me	la	is/de	fi		occasional	occasional	occasional	
	<i>Entada arenaria</i>		geo	cr	pl	la	is/de	fi			rare	occasional	
	<i>Erythrina decora</i>	En/F		ph	me	ve	is	de/su					1918CD
	<i>Guibourtia coleosperma</i>	F		ph	no	pe	is						2018AB, 2020AD
	<i>Indigastrum costatum</i>			th	na	ve	is						2018BC
	<i>Indigastrum parviflora</i> subsp. <i>occidentalis</i>		hl	ch	mi	la	is	fi		rare		common	
	<i>Indigofera alternans</i> var. <i>alternans</i>			hc	na	ve	is						2119DA
	<i>Indigofera arenophila</i>		hl	ch	mi	la	is	fi			rare	occasional	
	<i>Indigofera auricoma</i>			th	na	ve	is						2017CB
	<i>Indigofera bainesii</i>		s2	ch	mi	la	is	fi		occasional	common	occasional	
	<i>Indigofera baumiana</i>		hl	ch	mi	la	is	fi		rare	occasional	rare	
	<i>Indigofera charlieriana</i> var. <i>charlieriana</i>		hl	th	mi	la	is	fi		common	occasional	occasional	
	<i>Indigofera colutea</i>			hc	na	co	is						2119AB, 2018CB
	<i>Indigofera daleoides</i> var. <i>daleoides</i>		hl	th	mi	la	is	fi		occasional	occasional	common	
	<i>Indigofera filipes</i>		hl	th	na	la	is	fi		rare	common	rare	
	<i>Indigofera flavicans</i>		hl	th	mi	la	is			occasional	occasional	common	
	<i>Indigofera hochstetteri</i> subsp. <i>streyana</i>	NEen	hl	ch	mi	la	is	fi		rare		rare	
	<i>Indigofera pechuelii</i>		hl	cr	mi	la	is	fi			rare	common	
	<i>Indigofera vicioides</i>		hl	th	na	la	is	fi		occasional	rare	occasional	
	<i>Lablab purpureus</i> subsp. <i>uncinatus</i>	Cas		hc	mi	co	is						1918DA
	<i>Leobordea platycarpa</i>		hl	th	no	la	is			occasional	rare	rare	
	<i>Leobordea schoenfelderii</i>			th	no	la	is						2020BB
	<i>Lessertia benguellensis</i>			ch	mi	ve	is						2020CA
	<i>Listia heterophylla</i>		hl	th	no	la	is			rare		common	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Macrotyloma axiliare</i>		hl	ch	mi	la	is				rare	common	
	<i>Mundulea sericea</i>		s1	ch	no	la	is/de	fi		occasional	occasional	common	
	<i>Neorautanenien amboensis</i>		s2	ch	me	la	is/de			occasional	occasional	occasional	
	<i>Neorautanenien mitis</i>		hl	ch	me	la	is/de			rare	rare	rare	
	<i>Neptunia oleracea</i>			th/hy	mi	ve	is	fi					1918CD
	<i>Otoptera burchellii</i>		s2	ch	mi	la	is/de			common	rare	occasional	
	<i>Peltophorum africanum</i>	F	t3/ s1	ph	me	pe	is	fi		rare	rare	common	
	<i>Philenoptera nelsii</i>		t2/ s1	ph	me	la	is/de	de/sc		common	common	common	
	<i>Pomaria burchellii</i>		hl	th	mi	la	is	fi		rare	occasional	occasional	
	<i>Pterocarpus angolensis</i>	F/NT	t1	ph	ma	pe	is/de	fi			occasional	common	
	<i>Ptychlobium biflorum</i> subsp. <i>angolensis</i>		s2	ch	mi	la	do			occasional		occasional	
	<i>Requienia pseudosphaerosperma</i>			hc	mi	ve	is						2018CB, 2020AD
	<i>Requienia sphaerosperma</i>		hl	th	mi	la	is			occasional	common	common	
	<i>Rhynchosia caribaea</i>			hc/li	mi	la	is						2017BC
	<i>Rhynchosia holosericea</i>			hc/li	mi	ve	is						2018BD
	<i>Rhynchosia resinosa</i>		hl	cr/li	mi	la	is			rare	rare	occasional	
	<i>Rhynchosia sublobata</i>		hl	cr/li	mi	la	is			rare	rare	occasional	
	<i>Rhynchosia totta</i>		hl	cr/li	mi	la	is			occasional	common	occasional	
	<i>Rhynchosia venulosa</i>		hl	cr/li	mi	la	is				rare	common	
	<i>Senna italica</i>		geo	cr/li	no	la	is/de			occasional	rare	common	
	<i>Tephrosia burchellii</i>		hl	th	mi	la	is	fi		common	common	occasional	
	<i>Tephrosia cephalantha</i> var. <i>decumbens</i>		hl	th	mi	la	is	fi			rare	occasional	
	<i>Tephrosia dregeana</i>		hl	th	mi	la	is	fi		rare	rare	common	
	<i>Tephrosia lupinifolia</i>		hl	th	mi	la	is	fi		occasional	common	occasional	
	<i>Tylosema esculentum</i>		geo	cr/li	me	la	is/de			common	occasional	common	
	<i>Vigna frutescens</i>			hc/li	mi	co	is						2019DA
	<i>Vigna lobatifolia</i>		hl	cr/li	no	la	is				rare	occasional	

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					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Vigna unguiculata</i>		hl	cr/li	no	la	is				rare	occasional	
	<i>Zornia glochidiata</i>		hl	th	mi	la	is			occasional	rare	occasional	
<b>Gentianaceae</b>													
	<i>Enicostema axillare</i> subsp. <i>axillare</i>			hc	mi	la	is						2020BA
	<i>Sebaea grandis</i>		hl	cr	mi	la	is			rare		rare	
<b>Geraniaceae</b>													
	<i>Monsonia angustifolia</i>		hl	th	mi	ve	is			rare	rare	occasional	
<b>Gisekiaceae</b>													
	<i>Gisekia africana</i>		hl	th	le	la	is	su		common	common	occasional	
<b>Lamiaceae</b>													
	<i>Acrotome angustifolia</i>		hl	th	mi	la	is			common	common	occasional	
	<i>Acrotome fleckii</i>	En		th	na	pe	is						2019DA, 2017CB
	<i>Acrotome inflata</i>			th	mi	pe	is						2017CB
	<i>Clerodendrum ternatum</i>		hl	cr	mi	la	is/de			common	common	common	
	<i>Endostemon tereticaulis</i>		hl	th	mi	la	is			rare		occasional	
	<i>Leucas capensis</i>			ch	na	ve	is						2119DA
	<i>Leucas pechuelii</i>	NEn	s2	ch	mi	la	do			rare		common	
	<i>Ocimum americanum</i> var. <i>americanum</i>		hl	th	na	la	is			occasional	rare	occasional	
	<i>Ocimum filamentosum</i>		hl	th	mi	la	is			rare	rare	occasional	
	<i>Plectranthus hereroensis</i>			th	no	pe	is						2017DA
	<i>Plectranthus neochilus</i>			th	mi	la	is	su					2119AB
	<i>Rothea myricoides</i>		s2	ch	mi	la	is/de			rare	rare	occasional	
	<i>Rothea uncinata</i>		s2	cr	mi	la	is/de			rare	occasional	occasional	
	<i>Syncolostemon bracteosus</i>		hl	th	na	la	is			rare	occasional	rare	
<b>Lentibulariaceae</b>													
	<i>Utricularia stellaris</i>			hc	le	la	is	ca	hy				2118AB
<b>Loranthaceae</b>													

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Erianthemum ngamicum</i>			ch	mi	ve	is	sc	pa				2018BD
	<i>Plicosepalus kalachariensis</i>			ch	mi	ve	is	pv/sc	pa				2017CB, 2020AD
	<i>Tapinanthus oleifolius</i>		para	ch	mi	la	is	sc	pa	rare		occasional	
<b>Lythraceae</b>													
	<i>Nesaea saluta</i>			th	la	ve	is						2118AB
<b>Malpighiaceae</b>													
	<i>Sphedamnocarpus pruriens</i> subsp. <i>pruriens</i>			ch/li	mi	pe	is						2019AC
<b>Malvaceae</b>													
	<i>Abutilon austro-africanum</i>		hl	ch	no	la	is/de			rare		rare	
	<i>Gossypium anomalum</i> subsp. <i>anomalum</i>			ch	mi	pe	is						1918DA
	<i>Hibiscus caesius</i>		s2	ch	no	la	is/de			rare		rare	
	<i>Hibiscus calyphyllus</i>		s2	ch	no	la	is/de			occasional		occasional	
	<i>Hibiscus elliotiae</i>		s2	ch	mi	la	is/de			rare		rare	
	<i>Hibiscus engleri</i>			hc	no	pe	is						2017CB
	<i>Hibiscus fleckii</i>	En		hc	no	la	is						2118AA
	<i>Hibiscus meeusei</i>		hl	th	no	la	is			occasional	common	occasional	
	<i>Hibiscus micranthus</i>		s2	ch	mi	la	is/de			occasional		occasional	
	<i>Hibiscus nigricaulis</i>			th	no	pe	is						1918DA, 2019AC
	<i>Hibiscus sidiformis</i>		hl	th	mi	la	is			rare		rare	
	<i>Hibiscus trionum</i>	Nat		th	mi	pe	is						2017CB
	<i>Hibiscus vitifolius</i>		hl	ch	no	la	is/de			rare	rare	occasional	
	<i>Pavonia burchellii</i>		s2	ch	mi	la	is/de			occasional	rare	occasional	
	<i>Pavonia clathrata</i>		s2	ch	mi	la	is/de				occasional	occasional	
	<i>Pavonia senegalensis</i>			th	no	pe	is						1918DA, 2019BC, 2020CA
	<i>Sida cordifolia</i>		s2	th	no	la	is			occasional	occasional	occasional	
	<i>Sida ovata</i>		s2	ch	mi	la	is			occasional	occasional	occasional	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
<b>Menispermaceae</b>													
	<i>Antizoma angustifolia</i>		s2	ch/li	mi	ve	is	sc		rare	rare	occasional	
	<i>Cissampelos mucronata</i>			ch/li	mi	pe	is						2019CB
<b>Molluginaceae</b>													
	<i>Corbichonia rubriviolacea</i>			hc	na	la	is	su					2019BC
	<i>Hypertelis bowkeriana</i>			th	na	ve	is	su					2119AA, 2119AB
	<i>Limeum arenicum</i>		hl	th	le	la	is			occasional	rare	occasional	
	<i>Limeum argute-carinatum</i>		hl	th	le	la	is			rare		occasional	
	<i>Limeum fenestratum</i>		hl	th	le	la	is			common	common	occasional	
	<i>Limeum myosotis</i>		hl	th	le	la	is			occasional	rare	occasional	
	<i>Limeum pterocarpum</i>		hl	th	le	la	is			rare		occasional	
	<i>Limeum sulcatum</i>		hl	th	le	la	is			occasional	rare	occasional	
	<i>Limeum viscosum</i>		hl	th	le	la	is			rare	rare	occasional	
	<i>Mollugo cerviana</i>		hl	th	le	la	is			rare		occasional	
	<i>Mollugo nudicaulis</i>	Ex	hl	th	na	la	is			rare		occasional	
<b>Montiniaceae</b>													
	<i>Montinia caryophyllaceae</i>			ph	mi	ve	is						2118AA
<b>Moraceae</b>													
	<i>Ficus sycomorus</i> subsp. <i>gnaphalocarpa</i>			ph	mi	co	is/de						2017BC
<b>Nyctaginaceae</b>													
	<i>Commicarpus pentandrus</i>			hc	mi	la	is						1918DA, 2119DA
<b>Ochnaceae</b>													
	<i>Ochna pulchra</i>		s1	ph	no	la	is/de				common	common	
<b>Olacaceae</b>													
	<i>Ximenia americana</i>		s1	ph	mi	la	is	sc		occasional	rare	common	
	<i>Ximenia caffra</i>		s1	ph	mi	la	is				rare	occasional	
<b>Orobanchaceae</b>													



Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Alectra orobanchoides</i>		para	th	pi	ve	ac		pa	rare	rare	occasional	
	<i>Alectra sessiliflora</i>		para	th	na	la	is		pa	rare	rare	rare	
	<i>Alectra vogelii</i>			th	na	la	is		pa				2020BD, 2017CB
	<i>Buchnera longespicata</i>			th	mi	ve	is		pa				2020BC, 2020BD, 2017CB
	<i>Hiernia angolensis</i>			ch	na	ve	is						1918DC
	<i>Striga asiatica</i>		para	th	le	la	is		pa		rare	occasional	
	<i>Striga gesnerioides</i>		hl	th	le	la	is		pa	occasional	occasional	occasional	
<b>Passifloraceae</b>													
	<i>Adenia repanda</i>		geo	cr/li	no	ve	is/de	sc		rare		rare	
	<i>Basananthe pedata</i>		hl	th	mi	ve	is			rare	occasional	occasional	
<b>Pedaliaceae</b>													
	<i>Dicerocaryum eriocarpum</i>			ch	na	ve	is						2118BA
	<i>Harpagophytum procumbens</i> subsp. <i>procumbens</i>	P	geo	cr/li	na	la	is/de			occasional	rare	occasional	
	<i>Harpagophytum zeyheri</i>		geo	cr/li	no	la	do/de				rare	occasional	
	<i>Pterodiscus ngamicus</i>			hc	mi	la	is	su					2119AA
	<i>Sesamum alatum</i>			cr	mi	la	is						2018BD, 2018CB, 2020AD
	<i>Sesamum capense</i>		hl	th	no	la	is			common	common	occasional	
	<i>Sesamum triphyllum</i>		hl	th	no	la	is			rare		occasional	
<b>Phytolaccaceae</b>													
	<i>Lophiocarpus tenuissimus</i>		hl	th	le	la	is				rare	common	
<b>Polygalaceae</b>													
	<i>Polygala kalaxariensis</i>			ch	na	ve	is						2018BD
	<i>Polygala leptophylla</i>		hl	ch	na	la	is			rare	rare	rare	
	<i>Polygala schinziana</i>		hl	th	na	la	is			rare	rare	rare	
	<i>Securidaca longepedunculata</i>		t3/s1	ph	mi	la	is/de	sc			rare	occasional	
<b>Polygonaceae</b>													

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					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Oxygonum alatum</i>		hl	th	mi	la	is			common	common	occasional	
	<i>Oxygonum delagoense</i>		hl	th	mi	la	is				occasional	common	
	<i>Persicaria hystricula</i>			th	mi	ve	is						2017CB
	<i>Polygonum plebeium</i>			th	na	la	is						2017CB
	<i>Rumex sagittatus</i>			hc	mi	la	is						2017DA
<b>Portulacaceae</b>													
	<i>Portulaca hereroensis</i>		hl	th	le	la	is	su		rare		occasional	
	<i>Portulaca kermesina</i>		hl	th	le	la	is	su		rare	rare	rare	
	<i>Talinum arnotii</i>		hl	cr	mi	la	is	su		rare	rare	common	
	<i>Talinum caffrum</i>		hl	cr	mi	la	is	su		occasional	rare	occasional	
	<i>Talinum crispatum</i>		hl	cr	mi	la	is	su		common	occasional	occasional	
	<i>Talinum tenuissimum</i>		hl	cr	mi	la	is	su		rare	rare	rare	
<b>Ranunculaceae</b>													
	<i>Clematis brachiata</i>			hc/li	mi	la	is						2119AB
<b>Resedaceae</b>													
	<i>Oligomeris linifolia</i>		hl	ch	na	la	is			occasional	occasional	occasional	
<b>Rhamnaceae</b>													
	<i>Helinus integrifolius</i>		s1	ph	mi	la	is/de			rare	rare	occasional	
	<i>Helinus spartioides</i>		s2	ch	mi	la	is/de	sc		occasional	rare	occasional	
	<i>Ziziphus mucronata</i>		s1	ph	mi	pe	is			common	occasional	common	
<b>Rubiaceae</b>													
	<i>Crossopteryx febrifuga</i>		hl	ph	no	la	is				rare	occasional	
	<i>Kohautia azurea</i>	En	hl	th	le	la	is			rare		rare	
	<i>Kohautia caespitosa</i> subsp. <i>brachyloba</i>		hl	th	na	la	is			occasional	occasional	occasional	
	<i>Kohautia cynanchica</i>		hl	th	na	la	is			rare		occasional	
	<i>Kohautia virgata</i>		hl	th	na	la	is			rare		common	
	<i>Pavetta zeyheri</i>			ph	mi	co	is/de						1918DA

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					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Psydrax livida</i>		s1	ch	mi	la	is				rare	common	
	<i>Pygmaeothamnus zeyheri</i> var. <i>zeyheri</i>			ch	me	la	is						2018CD
	<i>Spermacoce senensis</i>		hl	th	mi	la	is			occasional	rare	occasional	
	<i>Vangueria cyanescens</i>			ph	me	la	is/de						2017CB, 2018BD
	<i>Vangueria infausta</i>		s1	ph	no	la	is				rare	common	
<b>Santalaceae</b>													
	<i>Osyris lanceolata</i>			ph	mi	la	is		pa				1918DB
	<i>Thesium lineatum</i>			ch	le	ve	is		pa				2018BC
	<i>Thesium megalocarpum</i>			ch	le	ve	is		pa				2018BD, 2020AD
<b>Sapindaceae</b>													
	<i>Cardiospermum halicacabum</i>	Nat	hl	ch/li	mi	la	is				rare	occasional	
<b>Scrophulariaceae</b>													
	<i>Aptosimum albomarginatum</i>		hl	ch	na	ve	is	sc			rare	occasional	
	<i>Aptosimum angustifolium</i>		hl	ch	mi	ve	is				rare	rare	rare
	<i>Aptosimum arenarium</i>	En	hl	th	mi	ve	is				rare	occasional	
	<i>Aptosimum decumbens</i>		hl	th	mi	ve	is					rare	occasional
	<i>Aptosimum elongatum</i>			th	na	co	is						2018BD, 2020CA
	<i>Aptosimum glandulosum</i>		hl	ch	mi	ve	is				rare	rare	
	<i>Aptosimum lineare</i> var. <i>lineare</i>			th	mi	co	is						2119DA
	<i>Aptosimum lugardiae</i>		hl	ch	le	la	is				rare	occasional	
	<i>Jamesbrittenia atropurpurea</i> subsp. <i>atropurpurea</i>		hl	hc	le	la	is				rare	occasional	
	<i>Jamesbrittenia elegantissima</i>			hc	na	la	is						1918DA
	<i>Lindernia parviflora</i>		hl	th/hy	na	la	is				rare	rare	
	<i>Manulea dubia</i>			hc	na	la	is						2017DA
	<i>Selago amboensis</i>	En		hc	le	la	is						2017CB
<b>Solanaceae</b>													
	<i>Datura stramonium</i>	Nat	hl	th	no	la	is				rare	rare	

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Lycium bosciifolium</i>		s1	ph	na	la	is	sc		occasional		common	
	<i>Lycium cinereum</i>			ph	le	co	is						2017DB, 2018CA, 2018CB
	<i>Lycium eonii</i>		s2	ph	mi	la	is	sc		rare		rare	
	<i>Solanum burchellii</i>		s2	ch	mi	la	do			occasional	occasional	occasional	
	<i>Solanum catombelense</i>			ch	mi	co	is						2018BC, 2119AB
	<i>Solanum delagoense</i>		hl	th	no	la	do			occasional		occasional	
	<i>Solanum incanum</i>		hl	th	no	la	do			rare		rare	
	<i>Solanum kwebense</i>		hl	ch	mi	la	do			rare	rare	occasional	
	<i>Solanum multiglandulosum</i>			ch	mi	ve	is						2020CA
	<i>Solanum seaforthianum</i> var. <i>disjunctum</i>	Nat		ch/li	no	pe	is						2017CB
	<i>Solanum supinum</i>		hl	ch	mi	la	do			rare	rare	rare	
<b>Sterculiaceae</b>													
	<i>Hermannia bicolor</i>		hl	th	na	la	is			rare		rare	
	<i>Hermannia eonii</i>		hl	th/li	na	la	is			rare	occasional	occasional	
	<i>Hermannia guerkeana</i>		hl	th/li	na	la	is			rare	rare	rare	
	<i>Hermannia modesta</i>		hl	th	na	la	is			common	rare	occasional	
	<i>Hermannia tomentosa</i>		hl	th/li	na	la	do			rare	occasional	occasional	
	<i>Melhanianthus acuminata</i>		hl	hc	mi	la	is/de			occasional	rare	occasional	
	<i>Melhanianthus burchellii</i>			hc	mi	la	is						2119DB
	<i>Melhanianthus forbesii</i>		hl	hc	mi	la	is/de			rare		occasional	
	<i>Melhanianthus virescens</i>		hl	hc	mi	ve	is/de			rare	rare	occasional	
	<i>Waltheria indica</i>		hl	ch	mi	la	is/de			occasional	occasional	occasional	
<b>Strychnaceae</b>													
	<i>Strychnos cocculoides</i>		t3	ph	mi	la	is				rare	occasional	
	<i>Strychnos pungens</i>		t3/ s1	ph	mi	la	is/de				rare	common	
<b>Thymelaeaceae</b>													

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Gnidia polycephala</i>		s2	ch	le	la	is/de	sc		rare	rare	occasional	
<b>Tiliaceae</b>													
	<i>Corchorus schimperi</i>		hl	th	mi	la	is			rare	rare	rare	
	<i>Corchorus tridens</i>	Nat	hl	th	mi	la	is			occasional	rare	occasional	
	<i>Grewia avellana</i>		s2	ch	pl	la	is/de			rare	common	occasional	
	<i>Grewia bicolor</i>		s1	ph	no	pe	do/ de			occasional	rare	common	
	<i>Grewia falcistipulata</i>			ph	mi	pe	do						2019CB, 2018BC, 2018BD, 2019AC, 2019DA
	<i>Grewia flava</i>		s1	ph	no	la	is/de			common	common	common	
	<i>Grewia flavescens</i> var. <i>flavescens</i>		s1	ph	no	la	is/de			common	common	occasional	
	<i>Grewia retinervis</i>		s1	ph	mi	co	is/de						2017DA, 2018BD, 2018CA, 2018CB, 2019AC, 2019BC, 2019CD, 2019DA, 2020AA, 2020CA, 2119AB, 2120CA
	<i>Grewia tenax</i>		s1	ph	mi	la	is/de				rare	common	
	<i>Grewia villosa</i>		s2	ch	me	la	is/de			rare		occasional	
	<i>Triumfetta annua</i>			th	no	la	is						2017CB
	<i>Triumfetta rhomboidea</i> var. <i>rhomboidea</i>			th	mi	la	is						2017CB
<b>Turneraceae</b>													
	<i>Tricliceras schinzii</i> subsp. <i>schinzii</i> var. <i>juttae</i>		hl	th	no	la	is			rare	rare	occasional	
<b>Vahliaceae</b>													
	<i>Vahlia capensis</i>		hl	th	na	ve	is			rare		occasional	
<b>Verbenaceae</b>													

Family	Species	Status	Layer	Raunkiaer life form	Leaf					Overall abundance		Local Abundance	QDS
					size	inclination	chlorotype	morphotype	root	"Hardeveld"	"Sandveld"		
	<i>Chascanum pinnatifidum</i>		hl	ch	mi	la	is	fi		rare		occasional	
	<i>Chascanum pumilum</i>			ch	mi	la	is						2120CA
	<i>Lantana angolensis</i>		s2	ch	mi	pe	is			common	occasional	occasional	
<b>Violaceae</b>													
	<i>Hybanthus densifolius</i>			th	na	co	is						2118AA
<b>Vitaceae</b>													
	<i>Cyphostemma congestum</i>		s2	cr/li	mi	la	is/de			rare	rare	rare	
<b>Zygophyllaceae</b>													
	<i>Tribulus terrestris</i>		hl	th	mi	la	is	fi		occasional	rare	occasional	
	<i>Tribulus zeyheri</i>		hl	th	mi	la	is	fi		occasional	rare	occasional	

**Codes used:**

**Status (following Klaassen & Kwembeya 2013):**

Endemic

En

Near endemic

NEen

**Red Data Listed:**

Near threatened

NT

**Exotics:**

Non-indigenous (uncertain status)

Ex

Naturalised

Nat

Casual

Cas

Weed

Weed

Invasive

Inv

**Protected species:**

Nature Conservation Ordinance 37 of 1952 and 247 of 1977

P

Forestry Ordinance 37 of 1952 and Forestry Act 72 of 1968

F

CITES Appendix II

CII

**Vegetation layer (adapted from Edwards 1983):**

Herb layer:

hl

annual grass	ga
perennial grass	gp
geophyte	geo
parasite	para

**Shrub layer:**

low shrub <1m	s2
high shrub, 1	s1

**Tree layer:**

low tree, 2	t3
short tree, 5	t2
tall tree, >10m	t1

**Life form (following Raunkiear 1907):**

phanerophyte	ph	
chamaphyte	ch	
hemicryptophyte	hc	
cryptophyte	cr	
therophyte	th	
hydrophyte	hy	
liane	li	(all creepers and climbers have been included here)

**Leaf size (following Gillison & Carpenter 1997):**

		mm <sup>2</sup>
picophyll	pi	<2
leptophyll	le	2 - 25
nanophyll	na	25 - 225
microphyll	mi	225 - 2025
notophyll	no	2025 - 4500
mesophyll	me	4500 - 18200
platyphyll	pl	18200 - 36400
macrophyll	ma	36400 - 18 x 10 <sup>4</sup>
megaphyll	mg	> 18 x 10 <sup>4</sup>

**Leaf inclination (following Gillison & Carpenter 1997):**

vertical	ve
lateral	la
pendulous	pe
composite	co

**Chlorotype (following Gillison & Carpenter 1997):**

dorsiventral	do
isobilateral	is

deciduous  
cortic  
achlorophyllous

**Leaf morphotype (following Gillison & Carpenter 1997):**

rosette  
solid 3-D  
succulent  
sclerophyll  
parallel-veined  
filicoid

carnivorous

**Root type (following Gillison & Carpenter 1997):**

adventitious  
aerating  
epiphytic  
hydrophytic  
parasitic

**Overall abundance:**

Rare: present in <5 % of relevés  
Occasional: present in 5<20 % of relevés  
Common: present in 20<50 % of relevés  
Abundant: present in 50<75 % of relevés  
Wide-spread: present in >75 % of relevés

**Local abundance:**

Rare: < 0.1 % cover  
Occasional: 0.1 < 1 % cover  
Common: 1 < 10 % cover  
Abundant: 10 < 50 % cover  
Dominant: 50 < % cover

de  
ct (photosynthetic stem)  
ac (without chlorophyll, e.g. parasitic plants)

ro  
so  
su  
sc (not part of Gillison & Carpenter 1997 PFA's)  
pv  
fi (fern-like sensu Gillison & Carpenter 1997. All pinnatifid leaves have been included here)  
ca

(only above-ground roots)  
ad  
ae  
ep  
hy  
pa